

REMARKS

Reconsideration of the application is requested.

Applicants appreciatively acknowledge the Examiner's confirmation of receipt of applicants' claim for priority under 35 U.S.C. § 119(a)-(d) and receipt of applicants' certified copy of the priority document for the German Patent Application 198 23 748.0, filed May 27, 1998 supporting the claim for priority.

Claims 1-11 are now in the application. Claims 1, 3 and 7 have been amended. Claims 10 and 11 have been added.

Page 17, lines 19 and 20 of the Specification of the instant application have been amended to add reference symbols M and T for the breathing mask and the oxygen tent, respectively. The Drawings of the instant application have been amended to add a symbolic representation and reference symbols M and T to Fig. 1. Since the breathing mask and the oxygen tent were described in the original application and such devices are well known, no new matter has been added. The reason for adding these reference symbols is to support new claim 10.

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DRAWING AMENDMENTS

The attached sheet of drawings includes changes to Fig. 1. This sheet which includes only Fig. 1 replaces the original sheet including Fig. 1. In Fig. 1, a previously omitted breathing mask or oxygen tent and reference symbols M, T were added.

Please approve the drawing changes that are marked in red on the accompanying "Annotated Sheet Showing Changes" of Fig. 1. A formal "Replacement Sheet" of amended Fig. 1 is also enclosed.

Attachments: Replacement Sheet
Annotated Sheet Showing Changes

Page 16, line 4 and page 17, line 1 of the Specification of the instant application have also been amended to correct typographical errors.

In "Claim Rejections - 35 USC § 112", item 2 on page 2 of the above-identified Office Action, claims 3 and 7 have been rejected as being indefinite under 35 U.S.C. § 112, second paragraph.

More specifically, the Examiner requested a change in claim 3 which has been carried out. The Examiner also noted a lack of antecedent basis for the converter in claim 7.

Accordingly, claim 7 has been made dependent on claim 3 which introduces the converter.

It is accordingly believed that the claims meet the requirements of 35 U.S.C. § 112, second paragraph. The above-noted changes to the claims are provided solely for clarification or cosmetic reasons. The changes are neither provided for overcoming the prior art nor do they narrow the scope of the claim for any reason related to the statutory requirements for a patent.

In "Claim Rejections - 35 USC § 103", item 4 on pages 3-4 of the Office Action, claims 1 and 9 have been rejected as being

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obvious over International Publication No. WO 97/03746 to
Hammer et al. (hereinafter Hammer), under 35 U.S.C. § 103(a).

In "Claim Rejections - 35 USC § 103", item 5 on page 4 of the
Office Action, claims 1 and 9 have also been rejected as
being obvious over U.S. Patent No. 5,914,015 to Barlow et al.
(hereinafter Barlow), under 35 U.S.C. § 103(a).

Finally, in "Claim Rejections - 35 USC § 103", item 6 on page
5 of the Office Action, claims 3-5, 7 and 8 have been
rejected as being obvious over Hammer or Barlow in view of
U.S. Patent No. 5,843,383 to Williamson et al. (hereinafter
Williamson), under 35 U.S.C. § 103(a).

The rejections have been noted and the claims have been
amended in an effort to even more clearly define the
invention of the instant application.

More specifically, claim 1 has been amended to call for an
apparatus for plasma-chemical production of nitrogen monoxide
for medical purposes, to state that the reactor has a reactor
outlet and to recite an interface connected to the reactor
outlet to facilitate inhalation of gas, produced from said
reactor, by a person.

Support for the use of the apparatus for medical purposes is found on page 1, lines 11-13 and elsewhere in the Specification of the instant application. Support for the reactor outlet is found in Figs. 1 and 2 and the paragraph bridging pages 17 and 18 as well as reference numeral 44 in Fig. 3 and page 24, line 10-14 of the Specification of the instant application. Support for the interface is found in line 19 on page 17 of the Specification of the instant application.

New claim 10 calls for the interface being a breathing mask or an oxygen tent. Support therefor is found in lines 19 and 20 on page 17 of the Specification of the instant application. New claim 11 states that the gas is nitrogen monoxide, which is mentioned throughout the Specification of the instant application.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 1 calls for, *inter alia*, an apparatus for plasma-chemical production of nitrogen monoxide for medical purposes, comprising:

a plasma-chemical reactor for producing dielectric barrier discharges, said reactor including:

an electrode with a dielectrically effective layer;

an opposing electrode;

mutually facing surfaces of said layer and said opposing electrode forming a discharge gap therebetween for conducting a flow of a process gas containing nitrogen and oxygen in a flow direction;

a number of constrictions forming discharge zones through which the process gas is passed in said flow direction and within which a dielectric barrier gas discharge is created, said gas discharge producing a non-thermal plasma having a gas temperature of at least 400°C; and

a reactor outlet; and

an interface connected to said reactor outlet to facilitate inhalation of gas, produced from said reactor, by a person.

Independent claim 9 calls for an apparatus for plasma-chemical production of nitrogen monoxide for medical purposes, a reactor and an outlet connected downstream of said reactor for delivering nitrogen monoxide for medical purposes.

Hammer relates to a process and device for plasma-chemical decomposition and/or destruction of harmful substances. More specifically, Fig. 3 of Hammer discloses an electrode 10 having an inner metal cylindrical electrode 1 with cruciform metal disks 11-18 creating discharge zones and discharge-free zones. A counter electrode has a hollow metal cylinder 2 and a dielectric layer 3 on the cylinder 2. The counter electrode 2, 3 encloses a reactor volume. The reactor volume

is acted upon by quiet discharges, producing local field peaks in axial direction. As is stated in the Abstract of Hammer, the device serves the purpose of exhaust gas purification in internal combustion engines.

As described on page 13, lines 10-14 in the Specification of the instant application, Hammer describes a reactor constructed to produce pure nitrogen monoxide (e.g. used in automotive exhaust gas purification) as opposed to the invention of the instant application that is able to decompose both nitrogen monoxide and nitrogen dioxide. The ability to also decompose NO_2 provides significant advantages in terms of efficiency for the production of NO for medical applications, i.e. the inevitable and undesirable production of nitrogen dioxide can be removed in a relatively simple and cost efficient manner. It appears from the Abstract and the accompanying figures of Hammer that the purification is performed by plasma chemical decomposition using a coaxial electrode configuration and periodically spaced projections in the reactor for dielectrically impeded discharges using a sinusoidal voltage source.

Hammer does not show or suggest an apparatus for plasma-chemical production of nitrogen monoxide for medical purposes as recited in claims 1 and 9 of the instant application.

Hammer also does not show or suggest a reactor outlet and an interface connected to the reactor outlet to facilitate inhalation of gas, produced from said reactor, by a person, as recited in claim 1 of the instant application. Nor does Hammer show or suggest an outlet connected downstream of a reactor for delivering nitrogen monoxide for medical purposes, as recited in claims 9 and 11 of the instant application.

In addition, Hammer does not show or suggest that the interface is a breathing mask or an oxygen tent as recited in claim 10 of the instant application.

It is clear that the field of application for the reactor in Hammer is for purifying exhaust gases for internal combustion engines and not for medical purposes. It must be pointed out in this regard that a person skilled in the art would not look to Hammer because the field of application thereof (automotive exhaust purification) is far removed from that of the instant application (medical purposes).

Barlow relates to a method and apparatus for processing exhaust gas with corona discharge. More specifically, Figs. 1 to 1C of Barlow disclose a flow passage 102 enclosing a housing 104 through which exhaust gas 100 flows in passages

106 having electrodes 108. The electrodes 108 have a core 110 and a dielectric ceramic 112. The passages 106 have interior surfaces 114 with a catalyst coating 116.

Figs. 2 to 2B of Barlow disclose a housing 104 having a flow passage 102 for exhaust gas 100 or 100A. The exhaust gas 100 passes through parallel passages 106 along the length L of the housing and the exhaust gas 100A passes through the passages 106 along the width W of the housing 104. Walls 200 form electrodes 108 in the device of Fig. 2. Figs. 2A and 2B show a core 110, dielectric ceramic 112 on the core, interior surfaces 114 and catalyst material 116 on the interior surfaces.

It is stated in column 1, lines 16-23 of Barlow that the device is used to process combustion exhaust, specifically automobile and industrial combustion process exhaust gas.

Accordingly, it is clear that the Barlow reactor is also used for purifying exhaust gases of combustion engines. In addition, the purification process occurs in Barlow by using a corona discharge in the presence of a surface catalyst, which is a different technology from that described in the instant application (see the discussion of corona discharge on page 2 of the instant application regarding undesirable

production of NO₂ by the relatively low temperatures generated by the technology that requires the use of absorbers).

Similar to Hammer, Barlow does not teach or suggest an apparatus for plasma-chemical production of nitrogen monoxide for medical purposes as recited in claims 1 and 9 of the instant application. Barlow also does not show or suggest a reactor outlet and an interface connected to the reactor outlet to facilitate inhalation of gas, produced from said reactor, by a person, as recited in claim 1 of the instant application. Barlow additionally does not show or suggest an outlet connected downstream of a reactor for delivering nitrogen monoxide for medical purposes, as recited in claims 9 and 11 of the instant application, nor that the interface is a breathing mask or an oxygen tent as recited in claim 10 of the instant application.

Again, a person of skill in the art would not look to Barlow since the exhaust gases thereof are not suitable or intended for inhalation by patients for medical use.

Clearly, neither Hammer nor Barlow show or suggest an apparatus for plasma-chemical production of nitrogen monoxide for medical purposes as recited in claims 1 and 9, a reactor outlet and an interface connected to the reactor outlet to

facilitate inhalation of gas, produced from the reactor, by a person, as recited in claim 1, an outlet connected downstream of a reactor for delivering nitrogen monoxide for medical purposes, as recited in claims 9 and 11, nor that the interface is a breathing mask or an oxygen tent as recited in claim 10, of the instant application.

Williamson does not make up for the deficiencies of Hammer and Barlow.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claims 1 and 9. Claims 1 and 9 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 1.

Finally, applicants appreciatively acknowledge the Examiner's statement in item 7 of the Office action that claim 2 "would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims." In light of the above, applicants respectfully believe that rewriting of claim 2 is unnecessary at this time.

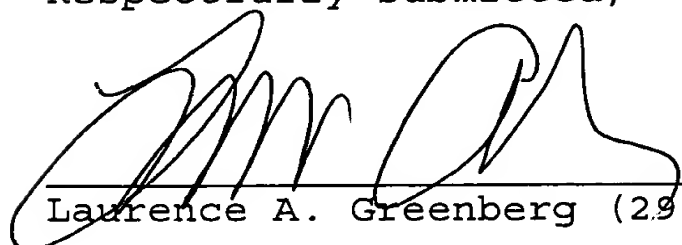
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In view of the foregoing, reconsideration and allowance of claims 1-11 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

Petition for extension is herewith made. The extension fee for response within a period of one month pursuant to Section 1.136(a) in the amount of \$120.00 in accordance with Section 1.17 is enclosed herewith. Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,



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